

3. The drawings also indicate that the drive unit 30 is a detachable drive unit as described in the specification on page 6 at line 25.

Objections Under Section 112

Examiner has objected to the phrase "non-positive drive" found on page 6, lines 24-25 and questions the meaning of the term. Further enlightenment of Applicant's definition of "a non-positive drive" is gained from the specification page 7, lines 4-7. Applicant indicates that a frictional drive system is a non-positive drive, and therefore, Examiner's statement that friction is a positive drive is inconsistent with the specification. It is submitted that Applicant as lexicographer can assign definitions to words, as long as the words and definition are not clearly inconsistent. Certainly the term friction drive implies a slipping type coupling, and therefore assigning the term "non-positive" to such a drive does not create a clear inconsistency.

With respect to the adjustment of the cutting gap on page 7 of the specification, the slot through which a pin wrench is inserted as illustrated in Fig. 4 could extend into one or both of the protuberances shown in Fig. 1, but the slot is a circumaxial slot, not the axial slot noted by Examiner in Fig. 1. The circumaxial slot is not visible in Fig. 1 since Fig. 1 is not intended to show a significant level of detail. Furthermore, the circumaxial slot could also extend into or totally occupy the space hidden behind the cutting blade 2 in Fig. 1.

The table on page 8 defines the prior art parameters of Fig. 5 as dimensionless quantities for comparison with the corresponding parameters of the present invention illustrated in Fig. 6. For example, if the prior art circular blade has a diameter of one unit, the invention utilizes a diameter that is 41% of the prior art blade or 0.41 unit.

The parameter comparison is intended to enumerate those parameters which are critical to the constant, burr-free cut-edge quality as discussed in further detail on page 4, lines 12-21 of the specification. The cutting angles for the prior art and the present invention are expressly illustrated in Figs. 5 and 6. The cutting angle as illustrated is defined by the tangents of the two circular blades at the nib of the overlapping blades.

With respect to the terminology in claim 1, the "non-positive drive connection between the blade shafts" at line 11 refers to the driving arrangement described more particularly on page 7, lines 4-10. Frictional engagement of the transport rings 19 and 20 with the circular blades 2 and 4 as best illustrated in Fig. 4 constitutes a non-positive drive. Again in contrast to Examiner's statement Applicant considers a friction drive to be a non-positive drive connection.

The reference to an acute angle in line 14 of claim 1 is believed to be clear and unambiguous. The angle α is now illustrated in Fig. 2 as amended. Examiner's question concerning "parallel or perpendicular to the horizontal plane" is not understood. It is axiomatic that the angular relationship between two intersecting planes is defined by the angle subtended by lines in the planes extending perpendicular to the intersection of the two planes.

The reference "means for rotatably supporting" in lines 15-16 of claim 1 corresponds to the bearings 11 and 12 shown in the disclosed embodiment.

The phrase "means for establishing and adjusting a cutting gap" of claim 1 refers to the bushing 13 and nut 23 in the disclosed embodiment. These elements and their function are described in further detail on page 5 lines 15-20 of the specification and page 7, lines 11-26.

In lines 19-20 of claim 1 the phrase "means for releasably coupling..." refers to any type of coupling that allows the drive unit 30 to be uncoupled from the

shaft 16. Such drive unit could be uncoupled by splines, cogs, a dog clutch, a belt and pulley and any number of other disengagable drives. For clarity Applicant has amended the illustration of the drive unit 30 in Fig. 1 to indicate that it is detachable as described in the specification on page 6, line 25.

Examiner has questioned the meaning of "means for nonpositively connecting one of the two circular blades to the driving unit". Since this recitation is in part redundant with the recitations found at lines 11 and 19-20, it has been deleted from the claim. It should be noted, however, that the description of the non-positive drive between the transport rings and circular blades on page 7, lines 4-10 clearly indicates that Applicant treats friction as a non-positive drive.

Examiner asks "what structural features" constitute the means for displaceably mounting in claim 6. Claim 6 further defines those structural features as the guide rails 6. In further response to the Examiner's query, such guide rails constitute a structure entirely different from the "means for releasably coupling" the driving unit and the cutter unit.

Claims 8-10, 12, 14, 15 and 17 have been amended to eliminate the need for antecedent basis for the phrase "the range".

With respect to claim 9, the claimed range has been corrected to fall within the range specified in claim 8 and to correspond with the preferred range defined in the specification on page 7, line 25.

With respect to claims 10 and 15, the cutting angle is defined by the tangents at the nib of the circular cutting blades illustrated in Figs. 5 and 6. The specification has been amended on page 8, line 12 to provide antecedent basis for the claimed range.

Similarly the specification has been amended on page 5, line 31 to provide antecedent basis for the recitations in claims 11 and 16, and on page 5, line

25 for the recitations found in claims 12 and 17, and on page 7, line 28 for the recitations in claim 14.

Claim 13 has been canceled in view of the redundancy with recitations in claim 1.

Claim 18 has been amended to substitute the term metal for material which lacked antecedent basis. In addition claim 18 has been amended to clarify the U-shape of the frame 5 as being the appearance when viewed from above.

Claim 20 has been amended to clarify the orientation of the circular cutting blades.

In claim 21 the supporting unit refers to the guide rails 6 and the bushings 26,27 as defined in the specification on page 5, lines 32+. The "means for transmitting the drive motion to the other or upper of the circular blades would constitute the transport rings 19-20.

The correlations given above between the claim elements and the drawings and specification are for Examiner's aid, and are not intended to limit the scope of the claims.

Claim Rejections Based On The Prior Art

Examiner has rejected all of the claims of this application on the basis of the prior art patent of Goeckel taken alone and in combination with Senftleben. These rejections are traversed and reconsideration is requested in light of the amended claims above and the following comments.

Examiner asserts that Goeckel includes a means C₁ for establishing and adjusting a cutting gap and at the same time includes a friction drive between the upper and lower blades. It is apparent; however, from the drawings of Goeckel that both a gap and a friction drive can not exist together as asserted by Examiner and as

claimed by Applicant. It would appear that the means C1 is utilized to ensure that no gap exists between the upper blade A and the lower blade B so that frictional contact is established for driving the upper blade from the lower blade.

Additionally Applicant notes that the lower blade B of Goeckel is a basin- or dish-shaped blade with a flat vertical edge against which the upper blade A must rest in order to rely upon the lower blade for driving engagement.

In contrast, Applicant's invention has both a non-positive drive connection between the blade shafts and a cutting gap between the two circular blades. Driving the upper cutting blade within the self-contained and laterally displaceable cutter unit is no small problem. The frame 5 itself with offset upper and lower legs and an interconnecting flat yoke does not permit an internal transmission of driving motions to the upper blade, and the unitized construction of each cutter unit for easy displacement and replacement forecloses an external transmission link between the two blade shafts. See the advantages discussed on page 3 line 33 and page 4 line 11.

At the same time Applicant's apparatus permits the establishment, adjustment and maintenance of a cutting gap between the two circular blades. Such a cutting gap is considered an important feature for a constant, burr-free cutting edge quality in the finished product. See page 4, lines 12-13 and page 7, lines 23-26.

Applicant achieves the improved results with the mounting of the blades in an individual rigid support frame, and with a non-positive drive connection between the blade shafts. In the illustrated embodiment, the drive connection is composed of transport rings 19,20 that are mounted for rotation with one of the blades and in driving engagement with the other blade. The transport rings ensure that the two blades are rotating as a length of sheet metal enters the nib of the blades as illustrated in Fig. 6.

It is important to note that the non-positive drive connection between the blade shafts allows the upper and lower blades to be adjusted with a cutting gap between them while maintaining the driving effect between the two blades. This result must be contrasted with Goeckel which displays no such non-positive drive connection between the blade shafts and instead relies upon frictional engagement of the upper and lower blades themselves to produce the driving effect. If the blades of Goeckel are adjusted to provide a cutting gap, there is no driving effect of any type to the upper blade because Goeckel does not possess a non-positive drive connection as claimed by Applicant.

In summary, Goeckel can not establish a cutting gap for the consistent burr-free cut-edge quality described on page 4, lines 12 and 13 of Applicant's invention and at the same time enjoy the advantage of the non-positive drive connection which causes the upper circular blade to rotate and does not interfere with the displacement or conversion times of the cutting units.

Claims 1 and 18 have been amended to refer to the transport rings that interconnect to circular cutting blades. Claim 21 already refers to a means for non-positively connecting one of the circular blades to the driving unit, and means for transmitting the driving motion provided by said driving unit to the other of said blades. Hence both of the blades are driven while a cutting gap is maintained between the cutting edges.

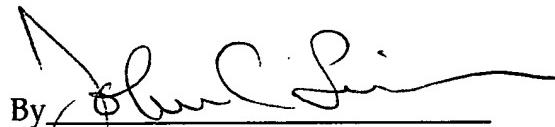
The patent to Senftleben and the other references fail to disclose the unique construction of Applicant's invention. For example, Senftleben would appear to have a fixed drive arrangement to each of the rotatable blade shafts which does not allow the freedom of axial adjustment, repair and conversion of Applicant's invention.

Accordingly, Applicant's circular cutter unit is patentably distinguishable from the prior art. Applicant has also addressed each of the formal objections to the claims as enumerated in the Office Action in December 30, 1996.

Favorable consideration is respectfully requested.

Respectfully submitted,

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